

## Suspended Solids Concentration - Turbidity Correlations: Comparison of Samples Collected During Dredging to Pre-Dredge Baseline Samples

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### Summary

A correlation between turbidity and suspended solids concentration (SSC) was established to support the use of real-time turbidity measurements as a surrogate for SSC in the water column during RM 10.9 dredging and capping operations. This technical memorandum presents the results for approximately 400 samples collected to date as part of the RM 10.9 Removal Action activities. As presented herein, similar linear correlations were found between samples collected prior to dredging operations and samples collected during the first month of dredging. Given the large number of samples and the statistically significant correlations found, CH2M Hill suggests that weekly sampling for the purpose of refining the turbidity / SSC correlation be discontinued.

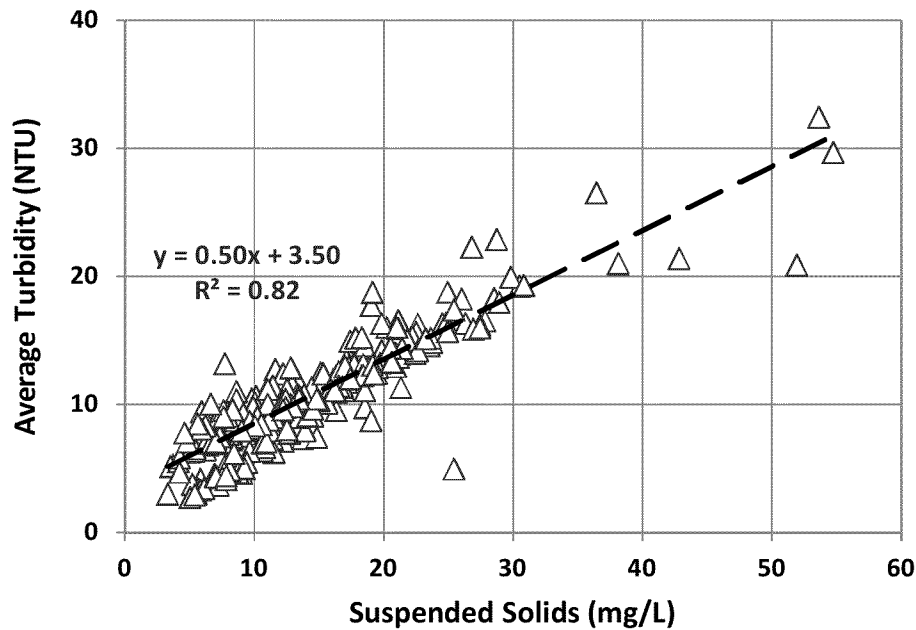
### Samples Collected Prior to Dredging

The pre-dredge baseline sampling event included collection of 300 surface water grab samples for laboratory analysis of SSC and concurrent *in-situ* measurement of turbidity. The samples were collected over a 10-day period, targeting different tidal periods. These samples were collected in the vicinity of the four stationary buoys (Buoys #1, #2, #3, and #4) from two depths, surface (1 ft below water surface) and mid-depth (mid-point of the water column). Surface water grab samples and concurrent *in-situ* measurement of turbidity were also collected along four transects situated near each of the stationary buoys, and included 3 locations per transect (west, center, and east channel) and 2 depths (surface and mid-depth). The correlation between these two parameters is presented in Figure 1. The p-value for the linear regression of the overall dataset is well below 0.001 indicating a statistical significance and the r-squared value of 0.82 indicates a high degree of correlation.

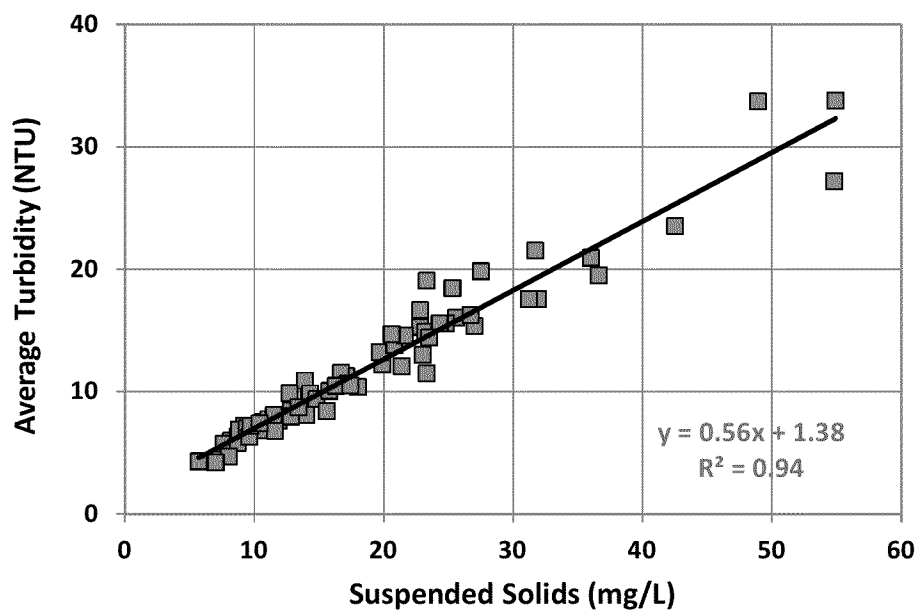
### Samples Collected During First Month Dredging

To verify the correlation obtained during the pre-dredge baseline sampling event, weekly sampling has been and continues to be conducted during dredging operations along the same four pre-dredge transects. In accordance with direction from USEPA, these samples are being collected from mid-depth since no significant differences were found between surface and mid-depth results obtained during the pre-dredge baseline sampling event. The scheduled routine weekly monitoring includes

twelve surface water grab samples for laboratory analysis of SSC and concurrent *in-situ* measurement of turbidity. Results for 72 samples have been received to date and are presented in Figure 2. The p-value for the linear regression of the dredging dataset is well below 0.001 indicating a high degree of statistical significance and the r-squared value of 0.94 indicates a high degree of correlation.



**Figure 1. Pre-Dredge Baseline Results (300 samples)**



**Figure 2. Dredge Results (72 samples)**

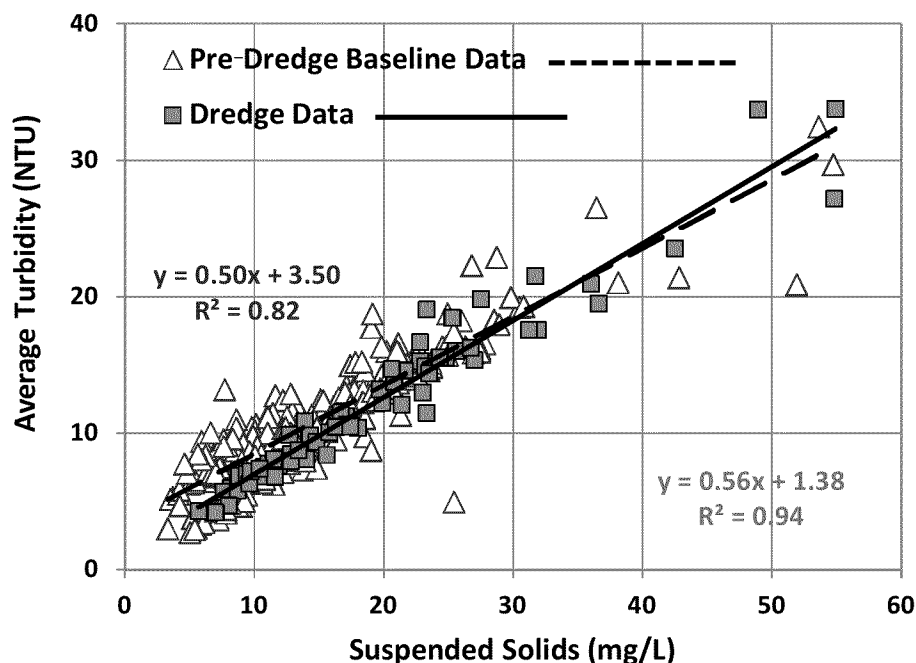


Figure 3. Correlation Comparison

## Conclusions

A comparison between the 300 pre-dredge baseline results and the 72 dredging results shows no relevant difference in the correlation between suspended solids concentration and *in situ* measurements of turbidity for purposes of characterizing water quality during RM 10.9 dredging and capping operations (See Figure 3).

Given these findings and the fact that the linear regressions are a statistically significant ( $p$ -value  $< 0.001$ ), the collection of additional data to further refine the linear regression correlation between suspended solids concentration and turbidity is not warranted.